

## Section 6.2 Tests for Parallelograms

**Objective** To recognize and apply the conditions that ensure a quadrilateral is a parallelogram, and to identify and use subgoals in writing proofs.

**Theorems** If both pairs of opposite sides of a quadrilateral are congruent, then the quadrilateral is a parallelogram.

If both pairs of opposite angles of a quadrilateral are congruent, then the quadrilateral is a parallelogram.

If diagonals of a quadrilateral bisect each other, then the quadrilateral is a parallelogram.

If one pair of opposite sides of a quadrilateral is both parallel and congruent, then the quadrilateral is a parallelogram.

**A Quadrilateral is a parallelogram if any one of the following are true.**

1. Both pairs of opposite sides are parallel. (*Definition*)
2. Both pairs of opposite sides are congruent. (*Theorem 6-5*)
3. Both pairs of opposite angles are congruent. (*Theorem 6-6*)
4. Diagonals bisect each other. (*Theorem 6-7*)
5. A pair of opposite sides are both parallel and congruent. (*Theorem 6-8*)

**Examples** The coordinates of the vertices of quadrilateral ABCD are A(-1,3), B(2,1), C(9,2), and D(6,4). Determine if quadrilateral ABCD is a parallelogram. Prove by Thm. 6-8

The coordinates of the vertices of quadrilateral EFGH are E(6,5), F(6,11), G(14,18), and H(14,12). Determine if quadrilateral EFGH is a parallelogram. Prove by Definition of a Parallelogram.

